Iowa Department of Natural Resources
Environmental Services Division
Air Quality Bureau

Air Dispersion Modeling Guidelines for Non-PSD, Pre-Construction Permit Applications

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Overview

Air dispersion modeling analyses are conducted to predict ground level ambient air concentrations of pollutants from facility emissions. According to 567 Iowa Administrative Code (IAC) subrule 22.3 (1) "A construction or conditional permit shall be issued when the director concludes that…the expected emissions from the proposed source or modification in conjunction with all other emissions will not prevent the attainment or maintenance of the ambient air quality standards specified in 567-Chapter 28." Dispersion modeling is the primary tool used in air quality assessments to determine predicted attainment of the National Ambient Air Quality Standards (NAAQS). Air dispersion modeling allows the impacts from a source to be determined before a source is constructed or modified and is not restricted to the spatial and temporal limitations of an ambient monitor.

These guidelines should be used to assist in the completion of air dispersion modeling analyses. The need to model a non-PSD project is determined by the DNR on a case-by-case basis. Form MD describes the method the DNR will use to determine when modeling analyses will be required. This form is optional, but can help applicants determine if modeling will be required. The construction permit directions, construction permit forms and additional modeling information can be found at the DNR website.

Homepage: http://www.iowacleanair.gov
Modeling: http://www.iowacleanair.gov/Modeling/Dispersion-Modeling
Permitting: http://www.iowacleanair.gov/Construction-Permits
Contact info: http://www.iowadnr.gov/About-DNR/DNR-Staff-Offices/Air-Quality-Staff

These guidelines apply to construction permit applications that are not subject to the Prevention of Significant Deterioration (PSD) regulations. For PSD modeling analyses, the applicant should refer to the Iowa DNR's PSD modeling guidelines[1]. Facilities that are associated with a State Implementation Plan (SIP) maintenance area, or that significantly impact a non-attainment area, may be required to conduct a comprehensive modeling analysis for the applicable pollutants regardless of the predicted impacts from the project.

Pollutants affected by these guidelines include all criteria pollutants except volatile organic compounds (VOCs) and ozone. If the Construction Permits Section requests modeling for these pollutants or for non-criteria pollutants, the DNR's Dispersion Modeling Team should be contacted for guidance on modeling.

A modeling protocol is not required for projects subject to only this guideline document.

Questions related to these guidelines and air dispersion modeling in general can be answered by calling 515-725-8200. Ask to speak to a member of the Dispersion Modeling Team.

Air Dispersion Modeling Determination

Refer to Form MD to determine if a modeling analysis will be required. There are unique circumstances that Form MD does not address that may trigger a modeling review. Examples of these are listed in the instructions for the form. Recommendations for modeling reviews that fall outside of this process will be reviewed by DNR management.

When dispersion modeling is required, the modeling analysis is either conducted by the DNR or is submitted by the applicant for DNR review. All applicants have the option to prepare and submit a complete dispersion modeling analysis according to these guidelines. The DNR will conduct the dispersion modeling when a modeling analysis has not been submitted by the applicant. In either case please make sure that both Form MI1 and Form MI2 are complete and provided with the application.

Dispersion Modeling Analysis Procedure

The dispersion modeling analysis can be divided into two phases. The Significant Impact Level (SIL) analysis and the comprehensive analysis. The SIL analysis is conducted first and is used to determine if a comprehensive analysis is necessary. A comprehensive analysis is required for each pollutant for which the project exceeds at least one SIL. The SIL

[1] https://www.iowadnr.gov/Portals/idnr/uploads/air/dispmodel/psd_modeling_guideline.pdf

analysis is optional and can be skipped if it is clear that the project will be significant. The comprehensive analysis includes both the project sources and all other sources of emissions at the facility and nearby facilities (if applicable). Some sources do not need to be included in the analysis and are described in the Source Information section below.

Dispersion Model Selection and Options

1. Unless approval has been secured from the DNR to use another model, the latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) model shall be used. Regulatory default options must be used unless otherwise approved by the DNR. As a screening tool, particularly for evaluating 1-hour impacts, AERSCREEN may be used.

2. For significant impact level (SIL) modeling, the predicted impact for the applicable averaging periods for each pollutant being evaluated must be compared to the appropriate significant impact levels as defined in 567 IAC subrule 33.3(20) and EPA memos: *General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level*, June 28, 2010; *Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program*, August 23, 2010; and *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014. These levels are listed in Table 1. For SIL modeling the highest concentration at the location of maximum impact (highest-first-high, or "H1H") must be considered. However, for 1-hour NO2, 1-hour SO_2, and 24-hour and annual PM2.5, the five-year average of the H1H concentrations from each year can be used.

3. For comprehensive modeling, the predicted concentration, including background concentrations, for the applicable averaging periods for each pollutant being evaluated must be compared to the appropriate level and form of the NAAQS. The levels of the NAAQS are listed in Table 2. Depending on the standard, the concentration that is compared to the NAAQS will vary. For example, the 3-hour SO_2 NAAQS must not be exceeded more than once per year, so the highest concentration at each receptor are ignored, and the highest of the remaining concentrations (highest-second-high, or "H2H") must be considered.

Table 1. Significant Impact Levels

Pollutant	Averaging Period	Significant Impact Levels ($\mu g/m^3$)	Modeling Value Rank ($\mu g/m^3$)
NO_2	1-hr[a] Annual	7.5 1	Average of each year's H1H over 5-years H1H
SO_2	1-hr[b] 3-hr	7.9 25	Average of each year's H1H over 5-years H1H
$PM_{2.5}$	24-hr[c] Annual[c]	1.2 0.3	Average of each year's H1H over 5-years Average of each year's highest annual value over 5-years
PM_{10}	24-hr	5	H1H
CO	1-hr 8-hr	2,000 500	H1H H1H

[a] The 1-hour NO_2 SIL has not been formally proposed. The SIL listed above reflects the interim SIL of 4 ppb (7.5 $\mu g/m^3$) presented in the U.S.EPA Memo, *General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level*, June 28, 2010.

[b] The 1-hour SO_2 SIL has not been formally proposed. The SIL listed above reflects the interim SIL of 3 ppb (7.9 $\mu g/m^3$) presented in the U.S.EPA Memo, *Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program*, August 23, 2010.

[c] The 24-hour and Annual $PM_{2.5}$ SIL was vacated on January 22, 2013. The DNR continues to use the SIL values listed above in accordance with the guidance presented in the U.S.EPA Memo, *Guidance for $PM_{2.5}$ Permit Modeling*, May 20, 2014.

Table 2. NAAQS Levels for Modeling Applications

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)
NO_2	1-hr Annual	188[a] 100[b]
SO_2	1-hr 3-hr	196[c] 1300[d]
$PM_{2.5}$	24-hr Annual	35[e] 12[f]
PM_{10}	24-hr	150[g]
CO	1-hr 8-hr	40,000[d] 10,000[d]
Lead	3-month rolling average	0.15[b]

[a] 5-year average of 8H daily 1-hour maximum (average H8H of daily maxima)
[b] Never to be exceeded (H1H)
[c] 5-year average of 4H daily 1-hour maximum (average H4H of daily maxima)
[d] Not to be exceeded more than once per year (H2H)
[e] Highest average of 8H over 5-years (average H8H)
[f] Highest average of annual mean over 5-years (average H1H)
[g] Expected number of exceedances per year, over 5 years, must be less than or equal to one (H6H)

For lead modeling, determining the design concentration requires the use of the EPA post-processor called "leadpost." The latest version may be obtained from the DNR or from EPA's SCRAM website[2].

4. Each NAAQS has its own rounding convention found in 40 CFR Part 50. It is acceptable to apply these rounding conventions to modeled concentrations. Guidance for applying these rounding conventions to the modeled concentrations can be found in the "Rounding of Modeled Concentrations for Comparison with the National Ambient Air Quality Standards" document[3].

Source Information

1. Emission units associated with the project must be modeled at their proposed allowable emission rates (lbs./hr). Varying emission rates are not permissible unless included in the permit limitations or it can be demonstrated that the variance is typical of a physical plant limitation. Comprehensive modeling of allowable emissions will only be completed on a case by case basis and is at the discretion of the DNR.

2. Existing emission units located at the facility, including non-point source emissions that could be reasonably captured and vented to the atmosphere, may be modeled at their actual emission rates, so long as the permits for those sources will not be modified. Actual emission rates are to be completed according to 3), 4), and 5) below. For guidance on modeling emission units that vent inside a building please use the Volume Source Tool[4]. No building enclosure credit will be given for sources of $PM_{2.5}$.

3. If the project emissions result in impacts that exceed the significant impact levels, existing sources that are part of the same facility must be included in the modeling analysis. The DNR may require additional nearby sources to be included in the modeling analysis in areas containing a large concentration of industry. Existing sources should be modeled at actual emission rates, but if this is not possible then the sources can be modeled at potential emissions as a conservative estimate.

[2] https://www.epa.gov/scram
[3] http://www.iowadnr.gov/portals/idnr/uploads/air/insidednr/dispmodel/rounding.pdf
[4] http://www.iowadnr.gov/portals/idnr/uploads/air/insidednr/dispmodel/vst_v1.5.xlsx

4. The DNR may require additional nearby source to be included in the modeling analysis in areas containing a large concentration of industry. Please contact the DNR if you are unsure if other facilities need to be included.

5. Actual emission rates used in the modeling analysis for existing emission units at the facility and nearby sources must be supported by the following acceptable methods, in order of acceptability:
   a) Certified continuous emissions monitoring data
   b) The most recent DNR approved stack test results. Contact construction permitting staff to obtain guidance on calculating an emission rate for modeling based on stack test results.
   c) Mass balance calculations acceptable to the DNR
   d) AP-42 emission factors or other engineering estimates (as accepted by the DNR), or other data as accepted by the DNR

   Note: When actual emission rates are calculated the facility may use actual hours of operation in calculating the emission rate. In addition, when AP-42 emission factors or other engineering estimates are used, the calculations shall be based on a minimum of 12-months of data available and the actual hours of operation. If a minimum of 12-months of data are not available, then the allowable or permitted emission rate should be used as applicable. If this is not considered representative, then the Construction Permit Section staff should be contacted for additional guidance.

6. All calculations, spreadsheets, figures, assumptions, control efficiency rate, and justifications used to determine the actual emission rates for existing facility emission units and nearby sources must be submitted with the modeling analysis report. If this information is not submitted, the DNR will use allowable (permitted emission rates or standards). If the allowables show an exceedance then the facility will be required to make appropriate changes.

7. The DNR may require re-modeling if there is a significant change in the method of operation or actual emissions.

8. Stacks with a horizontal discharge should be modeled as a horizontal point source. Care should be exercised when modeling horizontal point sources to ensure that building downwash is included. Stacks with an obstructing rain cap on top of the stack should be modeled as a capped point source. Stacks with a downward discharge should be modeled as a point source with an exit velocity of 0.001 m/s. Stacks with rain guards that do not obstruct the flow at the point of release can be modeled as a regular point source. Refer to the DNR's stack and vent guidance[5] document for additional details and examples of stack types that are considered unobstructed.

9. An emission point with stack gas exit temperature equal to the interior temperature of the building where the emission unit is located should be modeled at 68° F per the definition of "standard conditions" in 567 IAC rule 20.2, unless the applicant can provide justification acceptable to the DNR that another temperature is representative of the interior building temperature. An emission point with a temperature equal to that of the ambient air should be modeled at 0° K (which instructs the model to vary the temperature of the source with the ambient temperature).

10. Some source types are exhausted to the atmosphere through a long series of vents rather than a single stack. If the exhaust from this type of source is significantly warmer than the ambient air the source should be modeled using the BUOYLINE source type in AERMOD to account for the buoyancy of the plume. Examples of such sources include coke ovens or blast furnaces.

11. Guidance for evaluating non-standard types of emission units is available on the dispersion modeling website[6]. This guidance is intended to provide information on how the DNR would typically characterize non-standard sources in a dispersion model. Although this guidance does not preclude the use of other methodologies, the

[5] https://www.iowadnr.gov/portals/idnr/uploads/air/dispmodel/stacks_and_vents.pdf
[6] https://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling

applicant may wish to discuss other methodologies with the DNR prior to conducting extensive modeling analyses.

12. Section 5.2.4 of EPA's "Guideline on Air Quality Models" (Appendix W of 40 CFR Part 51) recommends a 3-tiered screening approach to estimate ambient concentrations of NO_2.

- Tier 1: Assume all emitted NO_x is converted to NO_2

- Tier 2: The default ARM2 option is based on multiplying an ambient ratio of NO2/NOx by a modeled NOx concentration to estimate ambient NO2 concentrations. These ratios are based on ambient levels of NO2 and NOx derived from national data from the EPA's Air Quality System (AQS). The ARM2 option applies an ambient ratio to the 1-hr modeled NOx concentrations based on a formula derived empirically from ambient monitored ratios of NO2/NOx. The ARM2 option includes default upper and lower limits on the ambient ratio applied to the modeled NOx concentration of 0.9 and 0.5, respectively. The user can propose alternate ambient ratios. If using the "ARM2" option in AERMOD, the model will calculate the correct values automatically.

  Per EPA guidance, there are caveats on the use of ARM2:[7]
  - Use ARM2 when Tier 1 (full conversion) results are between 150-200 ppb (282-376 $\mu g/m^3$).
  - If Tier 1 results are greater than 200 ppb (376 $\mu g/m^3$), but the ISR of the (primary) source is less than 0.2, ARM2 may be used.
  - If the Tier 1 results and the ISR are greater than 200 ppb (376 $\mu g/m^3$) and 0.2, respectively, the minimum ARM2 ratio should be set to match the (primary) source's ISR.

- Tier 3: Perform a detailed analysis on a case-by-case basis
  - Ozone-Limiting Method (OLM); works best for large groups of sources, area sources, and near-surface releases, including roadway sources
  - Plume Volume Molar Ratio Method (PVMRM); works best for relatively isolated and elevated point source modeling

EPA has issued a series of guidance memoranda describing the use of the 3-tiered approach.[8] The Tier 2 ARM2 method and the Tier 3 OLM and PVMRM methods are included as default options in the AERMOD dispersion model.

OLM and PVMRM require the specification of an in-stack ratio (ISR) for NO_2/NO_x, either for all modeled NO2 sources or for each source individually. When an individual source ISR is specified, it will override the default ISR, if any. When possible, source-specific ISRs should be used[9]. In the absence of this information, the default ISR of 0.50 should be used. The default ambient equilibrium ratio is 0.9, but with justification may be overridden.

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[7] Memorandum dated September 30, 2014: "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard."

[8] Memorandum dated June 28, 2010: "Applicability of Appendix W Modeling Guidance to the 1-hour NO_2 National Ambient Air Quality Standard;" memorandum dated June 29, 2010: "Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program;" memorandum dated March 1, 2011: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour National Ambient Air Quality Standard;" Memorandum dated September 30, 2014: "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard." These documents can be obtained from the DNR or the EPA SCRAM website (https://www.epa.gov/scram).

[9] The EPA has provided a *NO_2/NO_x In-Stack Ratio (ISR) Database* in which source-specific data can be both entered and/or utilized for Tier 3 OLM and PVMRM analyses; https://www.epa.gov/scram/nitrogen-dioxidenitrogen-oxide-stack-ratio-isr-database. Additionally, the California Air Pollution Control Officers Association (CAPCOA) Guidance Document on *Modeling Compliance of the Federal 1-Hour NO_2 NAAQS* may also be useful in determining source-specific ISRs.

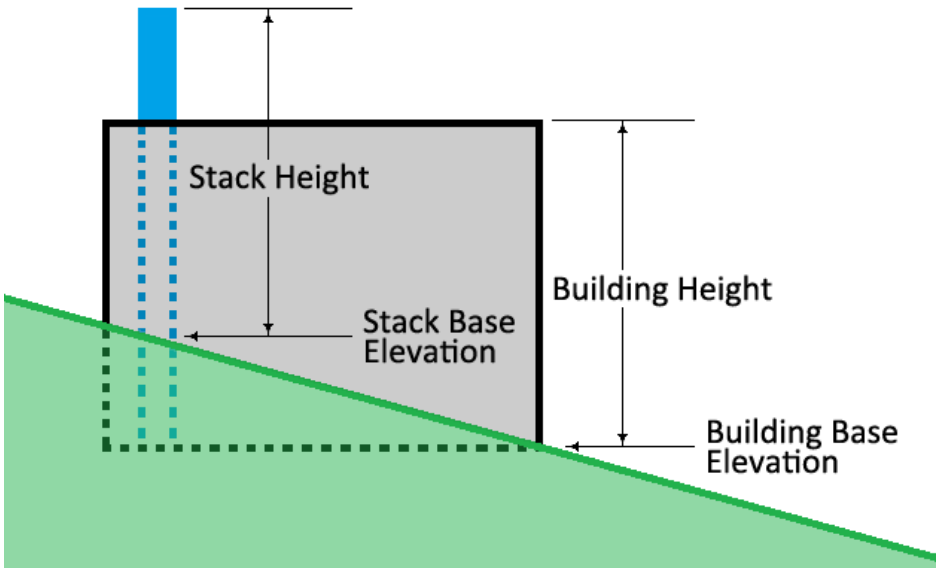
Additionally, OLM and PVMRM require the inclusion of ozone background. The DNR provides hourly background ozone data on the DNR's Background Data website[10].

It should also be noted that all three tiers of NO_2 modeling are classified as screening techniques and therefore negative emission rates should not be used to account for emission reductions when performing dispersion modeling for comparison to the SIL and to the NAAQS. DNR should be consulted for additional guidance if the Tier 3 approach will be used.

13. The merging of exhaust gas streams cannot be used in the dispersion modeling analysis unless the applicable requirements of 40 CFR Part 51.100(hh)(2) are met. If merged exhaust streams were modeled, provide justification.

14. Whenever possible, the base elevations of the sources and buildings should be based on plant survey data. If this data is not available, AERMAP-derived elevations may be used, but care should be taken to use elevations that are as accurate as possible.

    Depending on the topography, the base elevation of a source may not necessarily match the base elevation of the building on or near which it is located. This is most notable when a building is built into the side of a hill. When this occurs, the elevation of the source should be based on the natural contour of the hill – as if the land had not been graded when the building was constructed, and the stack height should be the height of the top of the stack above that base elevation. Stack heights are based on the elevation above the ground therefore if the base elevation is higher than it truly is, the stack height will be artificially taller. The base elevation of the building should be the lowest elevation along the base of the building, and its height should be the height of the peak of the roof above that elevation.



15. A building downwash analysis shall be conducted using the most recent version of EPA's Building Profile Input Program with Plume Rise Enhancements (BPIP-Prime). Off-property buildings that affect downwash must also be included in this analysis. All non-downwash structures should be excluded from the modeling analysis. Non-downwash structures include lattice-type structures such as switchyards, water towers, elevated storage tanks, and portable equipment mounted on a movable base. In some cases, differences in source and building base elevations can affect the building downwash calculations. Therefore, the downwash analysis should be conducted after the source and building base elevations have been input into the model.

16. Annual Hourly Operating Restrictions:

[10] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Background-Data

If annual hourly limitations are to be implemented without regard to season or month, the number of hours used should be divided by 730 hours and the result rounded to the nearest integer. Monthly averaging periods will then be modeled and the predicted concentrations from the highest months will be averaged. The number of months to include in the average is given by the integer from the previous calculation. The average predicted concentration is then multiplied by the number of hours of operation to which the emission unit will be limited and divided by 8760 hours. The result is the annual average and should be performed for each of the five years. If the number of hours to which the emission unit is to be limited is less than 365, the same procedure should be used replacing 730 hours with 24 hours and using the highest 24-hr averages rather than monthly averages.

17. Daily Hourly Operating Restrictions:
Varying emission rates may be used if the source(s) will be operated at specific times of the day. Use the EMISFACT keyword to accomplish this. If daily hourly operating restrictions are to be implemented without regard to specific times of day, the emission unit(s) should be modeled with an averaging period that corresponds to the number of hours that will be requested as the daily operating hour restriction. The impacts from this averaging period are then multiplied by the requested hours of operation and divided by 24 hours per day. The calculated impacts from the emission unit(s) with the daily operating restriction should be added to the impacts from the rest of the facility for each year of the modeling analysis. Please refer to guidance in "DNR Suggested Methodology for Modeling Restricted Hours of Operation".[11]

18. Sources Generally Exempt from Non-PSD Modeling:
The decision to include any exempt source in the modeling analysis is ultimately up to the discretion of the permit engineer; however emission units that are listed as exempt in 567 IAC subrule 22.1(2) are generally exempt from modeling. Facilities using the small unit exemption (567 IAC subrule 22.1(2) "w") should note that once the total combined emissions from all substantial small units using the exemption reaches the "cumulative notice threshold" as defined in 567 IAC subrule 22.1(2) "w"(8) and listed below in Table 3, the facility must apply for construction permits for all substantial small units for which the cumulative notice threshold has been reached. These substantial small units may need to be included in the modeling analysis as a part of the construction permit project.

Table 3. Cumulative Notice Threshold for the Small Unit Exemption

Pollutant	**Threshold (tons per year)**
SO_2	40
NO_X	40
VOC	40
CO	100
Particulate matter	25
PM_{10}	15
$PM_{2.5}$	10
Pb and Pb compounds expressed as Pb	0.6

Additionally, the following are also generally exempt from non-PSD modeling:

a) Emission units used only when the rest of the facility is **not** in operation. The DNR may require a separate modeling analysis of these units to verify attainment with the short-term NAAQS where applicable.

[11] http://www.iowadnr.gov/portals/idnr/uploads/air/insidednr/dispmodel/op_restrict.pdf

b) Intermittent sources, such as emergency generators, may present unique difficulties in attempting to demonstrate attainment with the new 1-hour standard for NO_2. The nature of the actual emissions associated with intermittent sources, when coupled with the probabilistic form of the 1-hour standard, may result in modeled impacts being significantly higher than actual impacts would realistically be. Combining the maximum allowable emission rate with the worst-case meteorological conditions defeats the intent of the probabilistic form of the standards to provide a more stable metric which would mitigate the impact that statistical outliers in the distribution might have on the design value. EPA has promulgated specific guidance on this issue in their memorandum of March 1, 2011, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard." The following is a summary of pertinent points:

   The applicant should consider whether the intermittent source needs to be modeled. The EPA says it is "acceptable to limit the emission scenarios included in the modeling compliance demonstration for the 1-hr NO_2NAAQS to those emissions that are continuous enough or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hr concentrations." For example, an intermittent source that is permitted to operate up to 500 hours/yr, but typically operates much less than 500 hours/yr and on a random schedule that cannot be controlled may be appropriate to eliminate from the model. On the other hand, an intermittent source that is permitted to operate only 365 hours/yr, but is operated as part of a process that typically occurs every day, may be less suitable to eliminate from the model.

   Based on this guidance, the DNR has concluded that any source that operates on a purely random schedule and is limited to operating for no more than 500 hours/yr can be considered an intermittent source. In addition, any source that meets the 500 hour/yr criterion, but operates on a scheduled basis for testing and maintenance purposes, can be considered an intermittent source if the scheduled testing and maintenance is limited to the time of the day with the most favorable dispersion conditions (between 9 AM and 4 PM). Intermittent sources may be excluded from the 1-hour NO_2 and SO_2 analyses.

c) Fugitive emissions from haul roads and material storage piles, unless the DNR has reason to believe that these units are the cause of a NAAQS violation. For ethanol facilities, haul roads are exempt from non-PSD modeling provided they have been issued a haul road construction permit(s) that requires best management practices (BMP).

Receptor and Terrain Elevation Information

1. Receptors should be placed along the property line at 50 meter intervals. Off property receptors should be placed at 50 meter intervals within at least 0.5 kilometers of the property line. If necessary to encompass the entire impact area, include receptors at 100 meter intervals from 0.5 kilometers out to 1.5 km, 250 m intervals from 1.5 km out to 3 km, and 500 meter intervals beyond 3 km. Receptor grids must be adequately dense and should use 50 meter receptor spacing to resolve the highest applicable concentrations. The receptor grid must extend at least 500 meters from the property line.

2. Receptor grids must be adequate in extent so that concentrations are decreasing at the edges of the grid. If there is a significant terrain rise near the edge of the grid, the grid should be extended to include the area of terrain rise.

3. For NAAQS analyses, only receptors at which the project will cause a significant concentration need to be included.

4. The most recent version of AERMAP should be used to import terrain and source elevations from the National Elevation Dataset (NED). County-sized NED data files are available on the DNR's elevation data webpage[12].

[12] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Elevation-Data

5. All terrain that would intersect a line projected at a 10% slope from each and every receptor must be included in the AERMAP domain. If elevations are not used, please provide justification in the modeling report.

6. By definition, "ambient air" is the portion of the atmosphere, external to buildings to which the general public has access [567 IAC rule 20.2]. Therefore facilities where the general public has access to the property (academic institutions, government buildings, hospitals, and business parks) must be modeled with receptors placed on the property of the facility. A change in the property boundary alone will not trigger a modeling analysis. The next project that does trigger a modeling analysis will include the updated property boundary. Applicants are encouraged to consider the effect that changes to their property boundary might have on future modeling analysis and subsequent permitting.

7. Receptors may be excluded from the modeling analysis, with the DNR's prior approval, for on-property easements, such as railways, provided that the facility owner or operator is willing to ensure public access to the right-of-way or easement is precluded. Permit applicants who obtain permission from the DNR to exclude on-property easement receptors from the modeling analysis must document in the modeling analysis report submitted to the DNR how public access is, or will be, precluded. Public roads or highways will continue to be modeled as ambient air.

Meteorological Data

Five years of meteorological data must be used. The DNR currently maintains five-year data sets for several National Weather Service (NWS) station locations. Applicants can obtain meteorological data suitable for use in the AERMOD model from the DNR's meteorological data webpage[13].

The website also contains a summary of the meteorological data that are appropriate for use in each Iowa County, as well as the representivity analysis that was conducted to determine the appropriate meteorological stations.

The profile base should be set to the station elevation of the station being used. The meteorological data sets located on the website include information on the profile base elevations for each station.

As deemed necessary, prognostic meteorological data that is appropriate for the location of the applicant's facility may be used with the prior approval of the DNR modeling team.

The use of meteorological data sets other than those provided on the website is not permissible without prior approval of the DNR modeling team.

Background Concentrations

Appropriate background concentrations must be added to modeled concentrations when a NAAQS analysis is being conducted. The DNR maintains default background concentrations that can be used without justification. Applicants may also propose alternate background concentrations. Current default background concentrations, and guidance for proposing alternate background concentrations, are available on the DNR's background data webpage[14].

The default SO_2 background concentrations represent natural background levels. As such, nearby sources of SO_2 emissions should be explicitly modeled when using the default SO_2 background concentrations.

Time-varying background concentrations may be used in some cases with prior approval. Applicants should contact DNR for case-by-case guidance.

Modeled Violations

Any source that significantly contributes (using the PSD levels of significance listed in Table 1) to a modeled violation of the NAAQS in ambient air cannot be permitted unless an equivalent ambient impact reduction is demonstrated at the

[13] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Meteorological-Data
[14] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Background-Data

modeled non-attainment receptors. If predicted exceedances of the NAAQS are modeled and the modeled impact from the source(s) does not exceed the PSD levels of significance at the receptors and for the time periods the modeled exceedances occur, the new permits(s) shall not be denied for modeling reasons. [567 IAC subrule 33.3(20)]

Modeling Data Submittal Requirements

A summary of the air dispersion model inputs, methodology, and results relative to all applicable standards and guidelines should be submitted. Include all dispersion model, BPIP-PRIME, and AERMAP input and output files on a CD or DVD.

It is important that the air dispersion modeling checklist for non-PSD construction permit applications and the Modeling Information form MI-1 (Plot Plan Requirements) are submitted with the construction permit application or the modeling analysis. The checklist is designed to help applicants avoid common dispersion modeling errors and can help prevent revisions to the modeling analysis. Including a hard copy and an electronic copy of form MI-1 may significantly decrease the amount of time taken to conduct the modeling analysis. Failure to submit the Modeling Information form MI-1 will likely result in delay of the project. Applicants may also choose to submit Modeling Information form MI-2 (Emission Point Characteristics) or equivalent, which may help expedite the modeling analysis. If this form is not included in the application the DNR will use the most current available information for sources that are not part of the project.